

do. And that's one of the reasons, I think, that looking at the historical cost is probably less informative than we might otherwise like it to be. Again, I think any model is a substantial improvement over what we've had and I thank you all for creating them so we could debate them.

Robert Loube, FCC

Thank you. One last thought before we go to the audience?

Robert Mercer, Hatfield Associates

Yes, just on this last interchange about comparing with actuality, David Porter mentioned one problem that looking at embedded cost. We've seen another problem in at least one comparison of Hatfield Model against a telephone company model. The telephone company model had deployed a very large amount of fiber to a very small town in the hills of a state that needn't be brought out because it's irrelevant here, but the point is that you also have to watch embedded in the sense of forward looking, where the telephone company may be deploying excessive technology for new services and then attributing the cost to the existing local network, and then comparing that to these models. So you're sort of bitten both ways. And I think that comparison with current cost is a very difficult comparison as a result.

Robert Loube, FCC

Jim, you want one final thought?

Jim Dunbar, Sprint

No, I'll pass.

Robert Loube, FCC

So let's go to the audience now for some questions. Before we proceed to the audience, I have a couple of short announcements. First, no speeches, just the questions. I'm sure all of you have — you know, you'll have time to file comments, so let's just have the questions. Second, we would like to afford the state staff, if they have questions, to ask theirs first, and so who is on the staff that wants to come forward? Labros? Please identify yourself and then ask your question.

Labros Pilalis, Pennsylvania Public Utility Commission

Labros Pilalis from the Pennsylvania Public Utility Commission. A couple of questions for the panel: Whether the cost models as they have been structured currently can simulate or take into account the use of wireless loops, especially in the rural areas, or other types of wireless technologies with progression to the provision of low-level broad band services. And in addition, to what extent these models can or will or whether they can be modified and structured to utilize

synchronous transfer mode ATM technologies as the basis for switching in the wire centers. Thank you.

Robert Loube, FCC

Who wishes to go first?

Robert Mercer, Hatfield Associates

With regard to the first question, it certainly is possible to include a wireless model. It's something we've looked at hard and have not yet competed in the Hatfield Model. I think it's important to do. It's hard to get a reliable cost estimate, particularly cost versus the capacity of the system needed to serve whatever criteria of customers you decide (inaudible), but we are still working on that. And I would not anticipate that it's too long to do that. As far as looking at an integrated broad band network with ATM switching and all fiber — you only mentioned the ATM switching part — yes you could do that. The interesting thing you're going to get into there, it's almost then like the whole switch becomes a common cost, because it's carrying zillions of cells that, you know, some are voice and some are other services. So you could get the cost of an ATM switch in there. I think it might be real interesting to figure out what portion of that you would then assign to each of the services that was using it. It is a well-known example that I think came out of the cable industry a few years ago that said if the amount of cells you need to carry for a movie was lost than

the cost of a movie, so it was attractive to consumers, then your local service would only cost 30 or 40 cents a month, or something like that. So it certainly can be done from a technical point of view. I think there could be some real allocation arguments when you try to do that.

Robert Loube, FCC

Jim, do you want to?

Jim Dunbar, Sprint

Yes. I think from the standpoint and looking at it particularly with the question related to the ATM switching, it certainly can be done. I think one of the things to recognize, no matter where we're sitting at this table, if someone tries to model the ATM switching, that's a significant variance from anything that has been modeled so far. And will not be something that will be done in two days, certainly. From a wireless standpoint, we have looked — we heard that question come from the Joint Board staff earlier. We've looked at the current equipment that's out there on the market. There is really not good current forward looking technology that's at the point where you can really identify what the true cost is of installing it. We can begin to engineer and model it as a forward looking technology. There are a lot of tests, there are a lot of samples, there are a lot of new types of equipment that may not have Spectrum yet form, for example. And one of the things that

were defined early on was that it had to be something, certainly, from our modeling perspective that was currently being used to place facilities out there, yet met all the standards of forward looking technology. As an alternative, what we did in the BCM2 and in the BCPM is allowed a capping of the loop cost at the best estimate of what the wireless technology would be, assuming at that point that you would switch to a wireless technology at the cap.

Robert Loube, FCC

Ben, do you have a —?

Ben Johnson, Ben Johnson Associates

Quick answer is no, our model doesn't deal with either issue, and I don't think that's of immediate concern. The immediate concern is trying to estimate as accurately as possible what it's costing to provide the kind of technology the customers are currently buying in these high-cost areas. Within a few years, I'm sure the ability to further refine and study those kinds of issues — you know, it's obvious you could do it tomorrow if for some reason it was priority. But in my own view, it is not the immediate priority. The immediate priority is being able to better understand why the models are generally predicting different costs than what has occurred in the embedded base, and that's where most of the attention needs to go. Is there a problem with the embedded base, which I think is part of

the answer, or is there still room for improvement in the models, and I think that's part of the answer.

Robert Loube, FCC

Anybody else want to?

David Gabel, Queens College

I just want to say one brief thing, Labros, and that is that in October of this year, there was a conference at Columbia University, that very topic was the wireless loop and the impact on universal service. And you can get the papers on that topic where people have done cost modeling on this issue and some of those papers will be in Telecommunications Policy within the next half a year, special issue.

Lisa K. Hanselman, GVNW Inc./Management

Just one comment and that is any time you have a network, there is a multitude of different technologies that are available to you. And as an engineer, looking at a standard set of forward-looking design is a frustrating thing when you've got a lot of different alternatives to do a cost/benefit analysis on. And I guess the question and what's going to be difficult going forward is as we get this particular model worked out and refined, what's going to happen is the technology is going to change and something else is going to become forward-looking. And then as we get that, something else is going to become

forward-looking, so it's going to be a real ongoing iterative challenge.

Robert Loube, FCC

Peter?

Peter Martin, BellSouth

Just a very quick comment. Ideally, wireless technology would be considered, and I think the approach of just using it as a capping mechanism is probably an appropriate one for now. I know BCPM and does and I'm not sure if Hatfield does that.

David N. Porter, MFS

I'm very gratified to hear somebody ask about something other than voice grade service. Thank you.

Robert Loube, FCC

Joel.

Joel B. Shifman, Maine Public Utilities Commission

I'm Joel from the Maine PUC. First question sort of leads into the second question. Have any of you actually ever gone out and seen if a 25- or 30-mile loop using loading coils and somewhat thicker cable actually delivers reasonable voice grade

transmission, and actually tried it in the field. And the follow-up question is that it seems that the various models are sticking to a dichotomy which are looking at either using copper with loading coils, which cause attenuation, or using a fiber-copper system with a fairly expensive cabinet topology for optical interfaces and are even fairly expensive cabinet topology for slick type systems. Why have none of the modelers used something that David Porter suggested, which are simple types of digital line carrier, or digital loop extenders, or digital regenerative devices that have been used in the independent industry for about the last 15 to 20 years, particularly were fairly ubiquitously deployed by REA borrowers since about 1985.

Ben Johnson, Ben Johnson Associates

I'll go first. I think it's an excellent suggestion for improving the models. You're dealing with the extreme cases and there's a tendency in building models to focus on the bulk of the data, the bulk of the problem. And the 20-mile loop is not something that I've thought about. And chances are there are other alternatives that make a whole lot more sense than load coils when you go out that far, because we know the service can be pretty bad.

Robert Loube, FCC

Jim, do you want to?

Jim Dunbar, Sprint

Well, the only thing I would comment on from that standpoint is in looking at the technology that's out there, and you mentioned, Joel, the high expense cost of the cabinet, that's more than the cabinet. You've got to recognize that's the central office equipment and all the repeaters associated with it, too. So it's more than just a single cabinet. But there are cost variances that are out there and they need to be recognized in terms of what does it. It's difficult for anyone to model in any model unless you start trying to make all kinds of unique assumptions to recognize what the outliers are.

Robert Mercer, Hatfield Associates

From our point of view, I have not personally tested 25 or 30 model loops. I'm relying on the subject matters experts we use in outside plant who continue to assure us that with the changes we're making that allow a coarser gauge and range extenders and the like that that's sufficient. I am handicapped by having to rely on people that supposedly know that business, but that's what they assure us. I have not looked at the extended digital loop carrier. All I can say is that's an interesting question. We certainly would want to go back and look at if that's a better alternative. I'm also hearing there is — and it may be sort of marrying the same family of products, but that there is an HDSL for long loops coming and that also would look. One of the things, you do have a little problem

sometimes in cost models, although it doesn't sound like it would be a problem here, is that it's hard to put something in a cost model until you have a reliable way of modeling the cost versus the capacity of the system, so new forward-looking stuff, like the HDSL solution, it may not be possible to do that yet. I'm certainly intrigued by your comment that REA companies have done that before, but it's not in the model as something to look at.

Robert Loube, FCC

No one else? Okay. Another state staffer have a question?

David Dowds, Florida Public Service Commission

Dave Dowds from the Florida Commission. I have two related questions. The first question is that in the Recommended Decision, the Joint Board has indicated that the revenue benchmark is supposed to be somehow or other based upon an average revenues per-line concept, which includes, at a minimum, discretionary services and I believe the footnote says "e.g., class services." My first question is, assuming the revenue benchmark should include revenues from class services, is any model that cannot model SS-7 deficient? My second question is, okay, can we actually finish a model until we define what "average revenues per line" consists of?

Robert Mercer, Hatfield Associates

The first part of the answer is no, I don't think you can model it right without signaling system 7, if that's a criteria. That's actually not one we've cited as why we do signaling system 7, but it's a good point. As far as the second one — I think I'm speaking for everybody, they can say if they disagree — these are cost models. If you get the cost model right, you do have to come up with the benchmark revenues. These costs — at least the Hatfield Model does not directly build in that revenue comparison to make. We're assuming that at some point that revenue benchmark will be determined, and then you could obviously put in a back-end output generator that would say "let's show what the revenue is so everybody doesn't have to sit and do it with a hand calculator." But being a cost model, it doesn't per se care yet about the revenue benchmark it's comparing to.

Jim Dunbar, Sprint

All right, I think from the standpoint to the extent that you agree that class services need to be part of the universal service definition and you need to make sure that the items that are costed, or the units that are costed match that definition, to the extent SS-7 is required, no, it's not in the current costing of the BCPM, but it is in fact in the commitment that sponsors have made, if you look at the filing, to handle all the unbundled elements within BCPM.

Robert Loube, FCC

Ben?

Ben Johnson, Ben Johnson Associates

I don't think it's a serious issue from our point of view. Our model does handle the custom calling services and class type services that are traditionally and typically used by most customers. They are primarily revenue generators and they are users of fixed costs. These costs are incurred even if they don't use those services. There are some additional costs, software costs in particular, but predominantly they are profit margins. Another maybe better example is Yellow Pages. It is an enormous generator of revenues for these phone companies. It's perfectly appropriate to consider it as an offset to the cost, even though there may be no cost *per se* involved. It's simply a well-known traditional source of money available to the incumbent carriers. So I think the Joint Board is headed in the right direction. There are a number of ways you can do it, but by conceptually saying that there's \$20, say, of revenue available and maybe \$2 of that is coming from Yellow Pages and on average 80 cents is coming from custom calling and so forth. And you get down to a net figure that the customer is seeing as the decision point for local service of maybe 15, that's an appropriate approach to the problem. It simplifies away a lot of issues. It avoids conflicts between the jurisdictional splits that might be used for other purposes, and still solves the problem in an

appropriate fashion, which is we're modeling the full cost of providing service to these customers, and there are many sources of revenues in addition to the local exchange revenues that can help pay those costs.

Robert Loube, FCC

Peter?

Peter Martin, BellSouth

I guess we look at this in a different way. We look at the benchmark as sort of the break point between the state and the federal responsibilities for funding universal service. And so in our opinion, the costs and the revenues of non-supported services shouldn't come into play at all. Again, all you're trying to do is determine how much the federal jurisdiction is taking responsibility for, and you need to understand that that's a relatively arbitrary decision. To the extent that costs exceed revenues, that needs to be supported. And whether it's at the federal or state level, it needs to be taken care of. Otherwise, you have implicit support and that goes against the intent of the 1996 Act.

Robert Loube, FCC

David?

David N. Porter, MFS

I think our expectation is that we will eventually get to a competitive environment, and if the intent of the model is to identify high-cost areas and not worrying at the moment about low-income customers, I guess I hesitate, or I am a little baffled to see the explicit need for revenue information. If you're a high-cost area, you're a high cost area and you get 10 bucks. If you're not a high-cost area, you're not. How else you choose to recover your revenue requirement, to use an ancient methodology, or your competitive return in today's world, is up to you, whether you get it from vertical services, local services, or toll services. I'm just worried about the cost.

Robert Loube, FCC

Does anybody else — David.

David Gabel, Queens College

I just want to add on this topic with measuring cost that unfortunately it isn't very simple to identify the cost of supported services and separate that from the cost of non-supported services. The best type of example that I can provide you is with a switching machine, where regularly a machine, like a DMS-100 or the 5-ESS, has had its guts stripped out and replaced with new equipment so that it could be used to provide new enhanced services, and also in order to be compatible to provide with SS-7 signaling. So when you do a cost study for

basic services, you need a depreciation rate. And the problem of saying "well, we're only going to apply this depreciation rate and only use it for cost study for basic supported services, basic exchange service and access to interexchange carriers," is when you're figuring out what's the cost of using that switching machine, it's very hard to separate out the cost of that equipment that's used for enhanced services from what's used for basic services. So since it's hard to separate out the cost, that's why there are reasons to say "well, since we can't separate out the cost, let's look at all the revenues that are derived from that common platform.

Robert Loube, FCC

Any other? John.

John Schrottenboer, Southwestern Bell Telephone Company

The only point I would make is that in dealing with this whole issue, we're dealing with two separate things here in terms of one is a definition of universal service for determining what are the costs to go into the process, and the other one is what are the revenues that go into making up the revenue benchmark. To me, in the Joint Board's recommendation, it didn't appear that those were the same. And that there needs to be some careful consideration to make sure that what you're defining as universal service in terms of cost and the way you define those services matches the revenue benchmark that you're going to establish for

purposes of determining the overall support. In the revenue piece, I think it also talked about having not only class revenues but access revenues. Is that all access revenues? That's clearly not part of the definition of "universal service." I think there needs to be some clarification and some matching of what's the definition of "universal service," what do you want to go into the cost, and what do you want to define as the revenue benchmark and make those consistent.

Robert Loube, FCC

Anyone else on this question? Jim, you mentioned to me that you wanted to say something again about what Joel asked earlier.

Jim Dunbar, Sprint

I inadvertently failed to answer the first portion of your question, Joel. As an outside plant engineer and having worked out there, yes, I have physically been out on some of the long loops. But an office is set for 1500 ohms, and that means that using the coarsest gauge cable which is conventionally 19-gauge, that the longest loop you're going to get that's going to work is about 15 miles. You will not see a working loop of 19-gauge copper long than about 15 miles. It just flat doesn't work.

Robert Loube, FCC

All right, Joel.

Joel B. Shifman, Maine Public Utilities Commission

As part of a philosophical (inaudible) question, but Ben has suggested using fairly adjustable inputs related to a specific wire center's actual characteristics, and so has Robert Mercer. In talking to him privately, he suggested that if you don't like the default value, you could come up with what the real values are, and substitute those for the default values. The question is that the Joint Board suggested the need to use proxies immediately for Tier 1 companies, and over a three-year transition for other companies. The problem is, when do proxies cease being proxies? In other words, if you start to use Ben Johnson's specific numbers for each wire center, and start to use wire center or company-specific inputs for — instead of default numbers, then really aren't you almost looking at forward-looking bottom-up costing models and not proxies? And that really what some of you were suggesting as you move away from — suggest making these modifications to proxies as effectively abandoning any really grossly average proxy system, replacing it with a somewhat uniform methodology, but really a bottom-up pricing methodology that's forward looking for the purpose of determining USF.

Robert Loube, FCC

Who would like to?

Ben Johnson, Ben Johnson Associates

Again, it may be confusing at times. I'm trying to talk about a model structure and approach that I think will work when we start trying to take this concept and applying it to situations where the rounding off and cancelling out of errors no longer is something you can ignore. For Southwestern Bell, maybe they can ignore it. What they really care is are they going to get any money from MFS and are they going to get any money from MCI and AT&T or not. On average, they're not a high-cost company, obviously. But they have some high-cost areas, that gives them a justification to draw money out of the pool to the extent other carriers are paying in who do not serve high-cost areas.

What I'm suggesting is that a model design that at least allows the ability to fine-tune these numbers will allow you to grow in your approach, that initially you're starting with a simplified proxy approach, but eventually you're going to start applying it to these independent companies. And as you get to that situation, you don't want to give them a windfall, you don't want to suddenly make the man rich because you actually made a mistake and for some reason you think it ought to be very expensive to serve here and in fact it isn't, you want the opportunity for somebody, such as the state commission, to step in and get accurate data and say, "no, this company is a medium-cost company; it's not extremely high-cost." That kind of refinement, I think, will become important as we deal with

smaller companies. It will also become increasingly important if it turns out a lot of money is flowing through this system. So even for the large companies it could be important to be accurate. But the FCC and the Joint Board are trying to deal with this concept of a proxy, and my mind is to say let's try a simplified approach initially, and I have no problem with that. You simply set many, if not all, the default values at a uniform level and run the model. That's the kind of thing we did in 10 days to make this filing, and in fact only took a couple days to actually do the data generation. But I do think a bottoms-up refined approach is ultimately where you'd want to be if you're going to have life and death — financial life and death decisions involved where you're talking about billions in money, but more importantly, thousands or millions that are direct meaningful decision of whether they continue to be a financially viable company or not, you need that level of accuracy a few years from now.

Robert Mercer, Hatfield Associates

My answer is yes. (Laughter) No. I think the last part of your statement was intriguing in that the last part of your statement, as I understood it, was that basically what you may have left if you decide that a small company problem is severe enough that you have to go in and custom fit those parameters. You know, you could say, well, it's still a proxy model because a proxy model had 400 inputs and all you're doing is changing inputs. I tend to think your characterization is what you've

obtained at that point is the methodology. So that you still sort of say I'm still looking at that company on a comparable basis than I was to much larger companies, but I am doing extra work. Again, I agree with the comment about the financial viability of the little company and the like. You don't have the sort of the law of large numbers that average a lot of things out and you may have to deal more specifically. And what's left still is a common methodology.

Jim Dunbar, Sprint

One of the things I think in commenting on proxy models in general and looking at the areas and all that I think we have to keep in mind and that is that a proxy model is not intended to replicate or exactly match the cost of any one that that's there right now. The proxy model is out there to identify what the cost is of serving any particular area. And I don't care what level of detail you want to go to with it for any prospective highly-efficient, forward-looking carrier. To that extent, it's got to reflect the new competitor as well as the incumbent in terms of the cost structure that would be incurred with it. If you're going to make support transportable or movable, you've got to turn around and have that support recognize the cost to both who has it today and who has it tomorrow, whether it's Company A, Company B, whether it moves to Company C, or whoever it is, that cost has got to universally define what an efficient carrier is going to have, no matter which approach they come from, whether they're an incumbent or not.

Robert Loube, FCC

Anyone else.

Peter Martin, BellSouth

I'm not sure it makes sense to look at it wire center by wire center, but I think that maybe state-by-state variations need to be considered. For example, on distribution to code, what percentage of the plan is aerial versus buried. Maybe a Florida, again, because of the threat of hurricanes, you'd need a higher percentage of buried cable. And another state maybe you need a higher percentage of aerial cable. So I think you need the ability to make those kind of adjustments in the model. But wire center by wire center, I'm not sure I see the value in that.

Robert Loube, FCC

I now would like to open it up to anybody else in the audience who would like to come forward and ask a question. Just come up; I don't know your names.

Richard Emmerson, INDETEC International

My name is Rick Emmerson, I'm with INDETEC International. My question is directed, initially, to Dr. Mercer but I'd welcome comments from the rest of the panel. If the cost of extra spare capacity today designed to serve tomorrow's customers should be considered a part of the cost of tomorrow's customers, should

today's customers have a cost that represents the same spare capacity that was placed yesterday?

Robert Mercer, Hatfield Associates

Well, I think they are. Clearly customers today are being served by cable that was either installed yesterday or the day before yesterday or last month, sometimes. So I think they are already carrying their fair share, even at 100% fill or 85% fill, they're carrying their fair share of investment. And in fact, that's exactly what you're doing is you're making them pay — that current rate base of customers pay for the cable that was out there for that purpose. And so it seems to me consistent to say, well, therefore in the future, if I'm putting in cable now for five years from now, like somebody put it in five years ago for me, yes, I think that me and the customers — I am still going to be paying for it five years from now, but so are a bunch of additional customers who showed up in response to the demand forecasts that said you needed extra cable there today. I don't see an inconsistency. Maybe you weren't suggesting one. But I think the answer is yes, you do pay today and you do pay tomorrow.

Robert Loube, FCC

Ben, do you want to (inaudible)?

Ben Johnson, Ben Johnson Associates

I really don't have that much to add, other than the fact that I really think, again, the answer lies somewhere between the extremes. Occasionally we've had in state proceedings actually filings by the phone companies, interestingly enough, sometimes where they are trying to defend a very low price for Centrex or something that they saw as very competitively sensitive, trying to run models with extremely high utilization or fill factors, 80-90%. That clearly was wrong, because it doesn't allow for the fluctuations and it doesn't allow for even a small amount of growth. At the other extreme, we're now seeing some filings in the context of unbundled loops and the like where companies are trying to justify 30% fill factors, effectively charging three times the cost of one loop for every unbundled loop they want to sell to their competitor. That's clearly wrong as well. I think the truth lies somewhere in between. I say we're at about 85% target, 65% achieved. We think that's just about right.

Robert Loube, FCC

Anybody else want to comment? Another question from the audience?

Brian Stair, Sprint

I'm Brian Stair with Sprint. An unbelievably simple question: If this Commission were to appoint a group of independent engineers to look at the networks that your models

construct, would you all agree to turn them over, let these engineers analyze that they can do what they're supposed to do, that they can provide the services we're talking about in USF?

Robert Mercer, Hatfield Associates

I think they can do that without my permission and I assume the same thing is true of these, because these are all public models, so you can go in and examine them and/or run them with inputs and get the results. You don't even need to ask. That's the nature of these public models as opposed to proprietary LEC models that have typically been used in the past for these kind of studies.

Ben Johnson, Ben Johnson Associates

I agree. They are open models. Ours is completely open. Anybody can test anything about it and identify where it can be improved.

Robert Loube, FCC

Any other questions from the audience.

Mark Kennett

I'm Mark Kennett and I wanted to ask all three of the people working on the models, having done a little bit of cost modeling myself, what seemed to be fairly critical in some of the things

I've played around with is the shape of the serving areas that you assume. And I'm wondering to what extent the CBGs that you're using are flexible in terms of their shape, length versus width. It can have a tremendous impact on the cost of distribution plant.

Robert Loube, FCC

In other words, not using the square shapes that they —

Mark Kennett

Exactly.

Robert Loube, FCC

Okay. Does anybody do any variation and come with any results?

Ben Johnson, Ben Johnson Associates

We haven't. We assume a stylistic network which can have a series of squares that are not necessarily four quadrants, that are not necessarily of identical size, but we have not experimented with rectangular shapes or other sorts of shapes.